

THIS MOTION is for:

1. an Order:

- a. suspending or adjourning the Technical Review and Public Hearing process respecting the proposed Vivian Silica Sand Extraction Project, including the setting of dates for Hearing and Pre-Hearing procedures and the exchange of Information Requests, for a minimum of 60 days;
- b. directing Sio Silica Corporation (the “Proponent”) to file materials rectifying the material deficiencies in its Application identified in the “Hydrogeology Technical Review” and “Geotechnical Technical Review” Reports and set out in the attached Appendix A within 60 days of the issuing of the sought Order;
- c. directing the Commission’s Technical Advisors to review any supplemental materials filed by the Proponent in response to the sought Order and to revise their Technical Reports accordingly.

THE GROUNDS FOR THIS MOTION ARE:

2. The Manitoba Eco-Network and Our Line in the Sand (the “Participants”) have been granted Participant Status in this matter;
3. The omissions and deficiencies in the Proponent’s Application under review materially impair the Participants’ abilities to assess the risks posed by the Proponent’s proposal, preventing their meaningful participation in this matter and their ability to assist the Commission in fulfilling its mandate;
4. The omissions and deficiencies in the Proponent’s Application materially impair the ability of the public to realize its statutorily-protected opportunity to be informed, to engage in this process, and to inform environmental decision-making consistent with the Minister’s Terms of Reference;
5. The omissions and deficiencies in the Proponent’s Application materially impair the Commission’s ability to fulfil its mandate set out in statute and in the Minister’s Terms of Reference to develop evidence-based advice and recommendations for the Minister;

6. Section 6(8) of *The Environment Act*, CCSM c E125 authorizes the Commission to “make rules governing its procedure”; and
7. Section 6(6) of *The Environment Act*, CCSM c E125 and section 88(1) of *The Manitoba Evidence Act*, CCSM c E150 grant the Commission the power to require the production of “such documents and things as the commissioners deem requisite to the full investigation of the matter into which they are appointed to inquire.”

Statement of Facts

8. The Minister of Conservation and Climate (now Environment, Climate and Parks) issued Terms of Reference on November 21, 2021 directing the CEC to undertake a technical review and a public hearing regarding the Proponent’s application for a license under *The Environment Act*,
9. The Commission retained Technical Advisors to prepare Technical Reports assessing the Proponent’s application, which were released to hearing Participants on September 26, 2022;

10. The Technical Reports characterize the application as containing material omissions and significant deficiencies, explaining that “the potential impacts [of the project] are many and not all the relevant issues were identified and resolved with the work described in the proposal;”

11. The omissions and deficiencies identified in the Technical Reports are summarized in the attached Appendix A to this Notice of Motion and include:
 - a. multiple failures to provide any information or analysis on material risks despite these risks being evident in past research on the affected aquifers,

 - b. multiple instances of the studies, testing, and analysis underlying the Proponent’s justification for its proposal relying on flawed assumptions and/or being otherwise irreconcilable with the conclusions drawn by the Proponent, and

 - c. the inadequacy of the limited temporal and geographic scope of the application for assessing the impacts of the entirety of the project;

12. The Minister's Terms of Reference and the Commission's statutory mandate together require the Commission to assess the potential environmental impacts of the proposal and develop advice and recommendations for the Minister respecting the Proponent's Application;
13. The Participants have a responsibility to assist the Commission in developing its advice and recommendations through the examination of evidence and the making of submissions;
14. The facilitation of meaningful public participation is among the purposes of the statutory licensing regime and the CEC's public hearing process; and
15. Such further and other grounds as counsel may advise and as the CEC Hearing Panel may allow.

THE FOLLOWING DOCUMENTARY EVIDENCE will be used at the hearing of the motion:

1. “Technical Review: Sio Silica Corporation’s Environment Act Project Proposal”, 19 September 2022, prepared by Dr. Hartmut Holländer and Dr. Allan Woodbury;
2. “Technical Review of Sio Silica Corporation’s Environment Act Project Proposal”, 13 September 2022, prepared by Arcadis Canada Inc.;
3. Appendix A to the Notice of Motion of the Manitoba Eco-Network and Our Line in the Sand;
4. Manitoba Clean Environment Commission Process Guidelines Respecting Public Hearings;
5. [Manitoba Clean Environment Commission Hearing Directive for the Vivial Silica Sand Extraction Project;](#)
6. [Manitoba Clean Environment Commission, “A Review of the Regional Cumulative Effects Assessment for Hydroelectric Developments on the Nelson, Burntwood, and Churchill River Systems” \(2018\);](#)

7. Manitoba Clean Environment Commission, “Report on Public Hearing: Bipole III Transmission Project” (June 2013); and
8. Such further and other materials as counsel may advise and the CEC Hearing Panel may permit.

DATED this 3rd 14th day of October, 2022.

Byron Williams



Chris Klassen

Counsel to
the Manitoba Eco-Network
and Our Line in the Sand

Additional Material Actions to be Completed, Documented and Submitted by Sio Silica to Address Material Deficiencies in its Application

	Material Action	References
1	<p>Pilot field tests of the treatment options for the removal of suspended particulate in process water for the UV treatment process and for disposal of wastewater and solids. Measurement of pH, dissolved oxygen, entrained air, amount of suspended and dissolved contaminants including heavy metals, and organics in the water separated for re-injection into the aquifer.</p>	<p>Sio Silica Supplemental Filing #3 Process Wastewater Treatment Options, Technical Memorandum by Matt Kowalski, PhD, P.Eng. Process Engineer, June 24, 2022 <i>“Due to uncertainty in the settling ability of the solids and unique characteristic of the wastewater it is recommended to pilot some of the recommended treatment options in order to assess the efficiency of the equipment treating the process water before proceeding with final equipment selection. It is especially recommended to pilot trial test the hydrocyclones and mobile/lamella clarifiers.”</i></p>
2	<p>Full scale field test of the latest Sio Silica well cluster design including, side sonar scans of the excavation cavity as a function of time for up to three months after the sand extraction, measurement of total sand extraction, total water extracted and as a function of extraction time, amount and location of air injection within production casing and directly into sandstone formation, water pressure measurements as a function of time at the top of the sandstone aquifer and in the carbonate aquifer during extraction, nearby test well water quality and microbial measurements before and after sand extraction at various distances from the well cluster, noise measurements as a function of distance from the extraction wells when all five extraction wells are operating, measurement of microbial content and organic content including diesel fumes, benzene, PAHs in injected air, and measurement worker’s respirable silica dust exposure using silica dust personnel monitors and area monitors.</p>	<p>Arcadis Canada Inc., p.14, <i>“Completing full scale extraction tests to confirm performance prior to advancing the full Project”</i></p> <p>Injection Well Permit # 2021.01.1 July 16, 2021, Manitoba Agriculture and Resource Development Water Branch for two injection wells Bru 92-8 and Bru 92-2 Condition 7: <i>“The injection well will be continuously monitored to ensure the formation is not over-pressured.”</i> Condition 8: <i>“The use of the injection well must cease immediately if any local water supplies are negatively impacted as the result of the use of the injection well.”</i></p> <p>Arcadis Canada Inc. comments on noise, microbial contamination from air and water injection.</p>
3	<p>New three dimensional geotechnical modelling of the latest Sio Silica design for well clusters and silica sand extraction. The modeling must include slope stability and potential liquefaction of the supporting sand pillars between excavation cavities, the potential collapse of the carbonate aquifer and the collapse of the shale aquitard. The modelling must take into account the effect of asymmetric excavation on the sand pillar stability and evaluate the potential stability of all well clusters over the entire 24 year project area</p>	<p>Sand pillar stability: Hollander and Woodbury p. 7, 24 <i>“It also assumes that the limestone bridging material remains intact but does not mention if the sandstone itself may liquify and flow into the voids that are created by the mining operation. There is some indication this would occur (Betcher et al., 1995).”</i></p> <p>Shale aquitard collapse: Arcadis Canada Inc., Executive Summary, p.16-17, conclusion #5</p>

	<p>taking into account the geological information from all Sio Silica Manitoba Groundwater Section well information reports of glacial till overburden, limestone and shale aquifer thicknesses and the documentation in the public comments by What the Frack Manitoba that all limestone thicknesses in Sio Silica wells east of highway 302 are less than the Stantec stability limit of 15 meters. The Sio Silica well information reports are available from What the Frack Manitoba or the Manitoba Groundwater Section. Additional well logs for Sio Silica EIS Hydrogeological Report are documented in the project registry 6119.00</p>	<p>Asymmetric excavation – Arcadis Canada Inc., memo p. A-4 <i>“The results of the trial work did report a different cavity expansion with the BRU 92-8 having a cavity expansion in a SW/NE direction.”</i></p> <p>Silica Sand Extraction Project-Environment Act Proposal – File No. 6119.00 Public Comments Received From Don Sullivan p. 10-15</p>
4	<p>New state of the art three-dimensional hydrogeological and contaminant transport modeling of the full scale sand mining operations including using point source water injection at the top of the sandstone aquifer to model 100% re-injection of water and simultaneous point source withdrawal near the bottom of the aquifer to model sand and water extraction for the number of wells to be operating simultaneously in a well cluster. Transport of dissolved and entrained air, iron and manganese precipitates, dissolved selenium, acid, heavy metals in the sandstone and carbonate for a collapsed shale aquitard must be modelled. The model must include the initial conditions of hydraulic head and ongoing recharge that is responsible for the initial hydraulic head distribution, heterogeneity of material properties, sensitivity studies with respect to model boundary conditions, hydraulic properties within the excavation cavity consistent with sand removal, salinity induced dependent flow, migration of saline waters into freshwater zones east of the Red River and other necessary hydrogeology modelling conditions documented in the hydrogeology technical report of Holländer and Woodbury.</p>	<p>Holländer and Woodbury hydrogeology report p.5 <i>“None of the analysis investigated groundwater quality changes due to the mining operations”</i></p> <p>Appendix A Notice of Motion of the Manitoba Eco-Network and Our Line in the Sand</p> <p>Silica Sand Extraction Project Environment Act Proposal – File No. 6119.00 Public Comments Received From Don Sullivan and D. M. LeNeveu p. 17 <i>“The groundwater model simulations using the finite-element code FEFLOW v.7.3 were unrealistic. Only zero and fifty percent re-injection of water was modelled. The fifty percent re-injection scenarios were actually drawdown simulations with about ½ the withdrawal pumping rate of the zero percent re-injection. No water re-injection actually occurred either in the modelling or in the field tests.”</i></p>
5	<p>Comprehensive geochemical re-testing of the glacial till overburden, carbonate aquifer, shale aquitard and sandstone aquifer throughout the entire 24 year project area using at least 30 separate samples from representative locations. The samples in the sandstone must include silica sand, interbedded shale, oolite and concretions. The samples must be protected from air exposure and analyzed as soon as possible after collection. Air lift methods must not be used to extract samples as this exposes the samples to air that may oxidize any sulphide in the samples during extraction. Sonic drilling methods may be required to obtain</p>	<p>Holländer and Woodbury, p. 9 <i>“The analysis for acid mine drainage, aqueous geochemistry and stable isotopes were carried out at one location only and limited samples (e.g., related to acid mine drainage) were taken.”</i></p> <p>Holländer and Woodbury, p. 42 <i>“Some of the samples (Winnipeg Sandstone) were even grab samples from a stockpile (p. 34). Such sampling is inadequate to be used for the geochemical analysis described later on.”</i></p>

	<p>samples from unconsolidated sandstone. Acid base accounting tests, trace metal analysis, shake flask tests and other comprehensive geochemical tests must be done on all samples. The sulphide sources in the sandstone aquifer such as concretions, oolite and interbedded shale that were not analyzed for the Sio Silica Hydrogeological Report of the EIS are documented in primary references of Watson (1985) and Schieber and Riciputi (2005) and in the public comments from What the Frack Manitoba in the project registry 6119.00.</p>	<p>Silica Sand Extraction Project Environment Act Proposal – File No. 6119.00 Public Comments Received From Don Sullivan and D. M. LeNeveu p. 2-9, p. 15 and 16</p> <p>Pyrite and Marcasite Coated Grains in the Ordovician Winnipeg Formation, Canada, Jurgen Schieber and Lee Riciputi, Journal of Sedimentary Research, 2005, v. 75, 907–920, https://www.semanticscholar.org/paper/Pyrite-and-Marcasite-Coated-Grains-in-the-Winnipeg-Schieber-Riciputi/c7260c14eefc435745019d169ed8f741ed4da6df</p> <p>Economic Geology Report ER84-2 Silica in Manitoba By D.M. Watson Manitoba Energy and Mines Geological Services Report, 1985 http://www.manitoba.ca/iem/info/libmin/ER84-2.pdf</p>
6	<p>Under the topic of accidents and malfunctions, not included in the Sio Silica EIS submissions, modelling of the accumulation of the highly toxic polyacrylamide monomer, selenium, acid, and heavy metals in the recycling slurry line loop loaded at the silica sand extraction site. The methods established in a study of polyacrylamide monomer accumulation in the Great Plains Sand Plant of Jordan Minnesota closed loop system can be used for the modelling. The modeling must include the effects of injection into the slurry loop of drainage water from the French style drain under the sand stockpiles at the processing plant documented in the NOA and public comments on the NOA of April 8, 2021 in project registry 6057.00. The consequences of a malfunction associated with a large deluge and the subsequent transfer of collected drainage water from the French drain style system into the recycling slurry line loop must be analyzed. The consequences of a malfunction allowing backflow from the slurry line into the aquifer water re-injection system must be assessed. The presence of dissolved selenium (selenate) in the solids transported in the slurry line has been established in the Sio Silica Hydrogeological Report on the project registry 6119.00. The presence of shale fragments that can generate acid and heavy metals in the transported slurry line solids has been established by the documentation of the potential collapse of the shale</p>	<p>Technical Memorandum, Great Plains Sand, T.Holstrom, March 9,2012 https://www.scottcountymn.gov/DocumentCenter/View/880/Exhibit-M-PDF?bidId=</p> <p>Silica Sand Extraction Project Environment Act Proposal – File No. 6119.00 Public Comments Received From Don Sullivan and D. M. LeNeveu p. 9-10</p> <p><i>“A spill from the CWS slurry lines that would carry selenium, fluoride, arsenic, other toxic heavy metals, and harmful microbes could drain into fish-bearing water bodies such as the Brokenhead River and Cook’s Creek. The slurry line would be expected to carry the extremely toxic acrylamide monomer from the clarifier tank. The contaminants would be ever increasing in the slurry lines as water is recycled and fresh extracted sand and flocculent is added to the slurry line and the recycled water loop.”</i></p> <p>Arcadis Canada Inc., p 26, Conclusion #14 <i>“The Project Proposal and supporting documents do not include an assessment of impacts that would be caused by accidents and malfunctions.”</i></p>

<p>aquitard in the Arcadis and the Holländer and Woodbury technical reports. The presence of other sources of sulphides that would generate acid and heavy metals in the silica sand transported in the slurry lines has been documented in Public Comments received from Don Sullivan and D. M. LeNeveu in the project registry 6119.00 and in the primary references of Watson (1985) and Schieber and Riciputi (2005)</p>	<p>Public Registry 6057.00 Vivian Sand Processing Facility Sio Silica Corporation Proponent Response and Public Comments filed on Notice of Alteration Apr.8, 2021 and Notice of Alteration Feb. 16, 2021</p>
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